

#2) Describe how science can be a sustainability problem; referencing at least four examples from films you watched this semester

It's odd to think that science can be a sustainability problem. But it is rather the interactions science has with government, industry and everyday life that hinder it, for science is in a battle against itself.

It is simply absurd that one could ask the general public "Is there climate change? Yes or No". Climate change is not an opinion up for debate, it is scientific fact. It is happening whether we want it to or not, and no amount of denial will change that. What is perhaps the most appalling is that portions of the world's governments question the scientific data coming from the scientific expert on the subject. Scientific facts cannot help sustainability causes because the facts are not being accepted, but there is no debate in a fact, therefore science is hindered by its own nature thanks to governments. In the films *The End of the Line* and *Disruption*, scientists warn the global leaders about the dangers of overfishing and continued exacerbation of climate change due to human activities, respectively. But the governments do not accept the facts as seriously as they should, for a myriad of different reasons. How can governments demand honest factual information when it is not harsh realities they want to hear?

Closely tied with governmental denial of scientific is the power industry holds over government. If scientists oppose an industry that has a symbiotic relationship with the government, the government most always supports the industry. In the film *Sharkwater*, the crew of the *Sea Shepherd*, a vessel owned by Greenpeace, the crew discover a boat illegally fishing for sharks off the coast of Guatemala. The *Sea Shepherd* was given permission by the Guatemalan federal government to tow the offenders into port, only to discover that it was they who were being arrested for no other reason than disrupting a source of high income for the government. The illegal shark fishing would mean large sums of under-the-table money for the government, so they protected the fishermen to protect their income at the expense of dwindling shark populations in those waters. When it's industry against science, it is unfortunately science that bears the burden of proof, only in many cases the proof extends time periods longer than the next paycheck.

Lastly, science must compete with practicality. Such is the case with organic foods—organic foods are generally more expensive than their health-deficient alternatives. So while the science behind healthier diets is there, there are many that are not able to afford that lifestyle. Tyson chicken is not only cheap but comes in many forms that streamline the cooking of the family dinner. Yet those that purchase Tyson over organic brands as a decision over price are at the mercy of Tyson's business model concerning chickens—thousands in cramped, disease-ridden chicken houses where they never see the light of day and are fed on unnatural diets, as shown in the film *Food Inc.* The same process is utilized for beef and pork. Many people are aware of the scientific benefits of eating organic foods, yet the loss of practicality associated with organics—namely higher prices and shorter shelf-lives in comparison to competing non-organic brands—turns many away. That is not to say that there are no measures being taken to not only increase awareness of organic foods but to also increase popularity. The film *Fresh* highlights Will Allen, who produces an urban garden in Milwaukee and educates about sustainable

organic processes and techniques, showing people that eating healthy is not as hard as it's made out to be. Science could use more people like him in its uphill battle for sustainability across all fronts.

#4) Discuss the relationship between social networks (Web and Internet) and sustainability. Include problems and solutions

One problem is that sustainability is a relatively vague topic; it has many definitions that all interconnect in different overlapping dimensions. Not only is sustainability an environmental issue but a social and economic one as well. It can be quite intimidating for someone that is not well versed in sustainability to find where to start, and this may lead to inaction. Someone may be willing to take action, but if they cannot find a starting point they may reconsider. If they have doubts on where to begin they may see the environmental movement as lacking in organizing power, and the movement would lose an additional voice. Even in the class this semester, it was at times hard to grasp the range of sustainability problems that coexist all over the world. It's intimidating for environmental students to know which problem to tackle first and how to prioritize them.

Social networks can start the conversations around action, therefore providing a medium through which people can converse and organize. By liking or sharing an article or video on Facebook or retweeting a video on Twitter, followers see what someone is concerned about and may research the matter themselves further. Eye-catching headlines, dramatic photos or trending hashtags all serve as catalysts in promoting all three categories of sustainability. Perhaps the most powerful form of social media today is the YouTube video. Lately the clip from *The Daily Show with Jon Stewart* about the judge's decision in the Eric Garner case has been spreading like wildfire, getting people thinking about social sustainability if they were blind to it before now. The strength of social media is that every viewer is free form their own opinion and branch their theories from the original source, extending the conversation further until it becomes household.

While social media networks provide people a medium in which they can connect and communicate, that is not to say that every opinion is scientifically sound. When there is a tragedy, such as the Michael Brown case in Ferguson, Missouri or the Eric Garner case in Staten Island, New York, it serves as a spark that ignites an explosion of opinions. While many opinions on Facebook or Twitter may be sound and based in logic and reason, there are just as many others that are not. That is the beauty of an opinion, everyone is entitled to one. But the cacophony of facts, disagreements and neutralities only serves to cover the truth behind an event. For those that may not be as well-learned in a subject area as those that are discussing about it in a chatroom, it may be daunting to try and interpret the hidden truths. A mislead opinion of one speaker may mislead another down the same path and so on, similar to the Butterfly Effect. Tidal waves of misinformation on social media networks could prove disastrous for the very causes they mean to support.

A way to combat the opinion cacophony could be to create a sustainability social network. There would be no cost to signing up to encourage anyone to join. It would be a separate social network from Facebook, Twitter, Pinterest, etc. to maintain the focus on environmental, economic, and social sustainability. A layout similar to that of Facebook would streamline the sharing of key articles, videos and general thoughts. This network would be a haven for those that advocate sustainability, from activists to sustainability novices and everyone in between. By concentrating a social network on solely sustainability, it would remove the excess attention-grabbing articles that may not be of equivalent importance but may dominate one's attention, such as the latest cat video on YouTube. This high focus would subconsciously place a duty on the users—if one took the action to join a sustainability-specific social network, then they might have it within themselves to take action on a particular topic, whether they know that at the time they sign up or not.

Social media networks are highly powerful engines of change that have started to become the springboard for sustainability action. They are one of the most powerful weapons the fight for sustainability holds in its arsenal, and therefore they must be utilized.

#6) Describe a film idea intended to educate a particular audience about a sustainability problem. Describe the audience you intend to reach, and its characteristics (biases, ignorance, expertise, etc); the aim of the film; its narrative structure and its content

If one were to start typing into Google "Films about plastic" as if browsing for films about plastic pollution, Google autofills your search query to "Films about plastic surgery" or "Films about plastic surgeons" before "Films about plastic" even becomes an option. While there are documentaries about plastic pollution, they are not numerous as one would hope. Most examine the life cycle of plastic in various regions of the world, and others highlight a particular sample of plastic; *Tapped* focuses on the water bottle and its harmful effects to both the environment and the human body. My idea for a film about plastic would take a slightly different approach to plastic that I have not yet come across, aiming to make viewers more involved in the processes behind plastic.

Fantastic Mr. Spork, my film idea, details the life cycle in detail of plastic sporks and other mundane plastic objects—sauce cups, saran wrap, disposable razors, etc. From the site where the oil is extracted, viewers follow the product on its journey across oceans to reach the United States and be processed and manufactured into the object. From there the journey continues as the product is shipped to its customer; say a takeout restaurant that provides plastic sporks. After the user discards the spork, the film then follows it through the waste disposal process, ultimately ending up in a landfill. I would end the film on a more positive note and highlight plastic alternatives, such as using containers that are made of glass instead of buying multiple plastic containers as in milk jugs, or starch-based biodegradable plastics. A final word on the importance of recycling plastics would leave the viewers on a pathway they can easily step forward on and start to take action on the individual level.

The trick to this film would be to follow the entire journey exactly—from the exact drilling site to the exact seller to the exact factory, and so on. I would want to do this to put a name, face and place to each step along the entire process. By showing an ambiguous processing plant, viewers will not connect to the issue as well as they would have if they knew exactly where it was and what it was doing. An emotional connection to plastic pollution will cause a stronger shift in attitudes and habits. The only problem with that is with all the films and documentaries about pollution of all sorts, habits have not significantly shifted enough on a large scale to begin to offset climate change.

The intended audience would be younger adults—middle school age to college age—because I believe younger people have a greater capacity to change their habits than older people. It is easier for an individual to start thinking and acting responsible earlier in life because it requires a lesser change in everyday habits than someone who may already have counterproductive or counterintuitive habits already in place. By presenting it to a younger audience that is old enough to grasp the science behind plastic, the younger viewers would become the drivers of tomorrow's change to a future that is less dependent on easily disposable, one-use plastic objects. They would have a bias before viewing the film—by that stage of their life they are already aware that plastic permeates their life in many ways, yet perhaps they have not fully registered it, therefore they may not see it for the problem it is.

By exposing the exorbitant amounts of energy needed to provide something so mundane, I would hope viewers would think twice about using plastic when it is not necessary. I do not expect a radical movement to arise from the film, I would merely want to expose the real stories behind plastics and let viewers make a decision for themselves.

#9) Identify five (5) actions that college students should take to advance sustainability. Include concrete examples to illustrate your ideas

An action college students could take, that most probably already do, to advance environmental sustainability would be to recycle and compost. In almost every college campus in the U.S., there are recycling bins next to the garbage can, but seldom does one see any signage pertaining to recycling, especially here at RPI. If students were to put a higher priority on recycling, I am sure recycling rates would increase. Composting is something that RPI does not take part in, as far as the students know. When students get lunch in the McNeil Room, most of them get their meals to go only to finish them and throw the containers into garbage cans located in the McNeil Room, when they could have used a plate and tray. If that food waste was sorted into compost, recycling and garbage all in one location, RPI's landfill contributions would decrease. Clubs could even take advantage of starting a recycling or composting trend by giving students coupons for "donating" their plastic water bottles and food containers. Fraternities and sororities on campus partake in recycling drives as part of the Green Greeks initiative. Cans and bottle return slips are donated to Green Greeks, and the chapter that donates the

most money (with stipulations in place to account for houses of different sizes) gets to donate that money to a charity of their choice. There is also a greenhouse on Sunset Terrace at the edge of campus that plans to begin food pickups from fraternities and sororities on Mondays. In time, participating houses would receive a portion of the composted dirt at no cost to be utilized in landscaping projects. Both initiatives raise awareness about food waste awareness that will hopefully spread to the rest of campus.

An action that could arguably be the easiest for college students (and professors as well) to undertake to advance environmental sustainability would be to use thinner fonts and thinner margins as the default for essays. In what started as a mere science project, 14-year old Suvir Mirchandani provided substantial evidence that thinner fonts like Garamond reduce ink purchasing costs, and with printer ink being more expensive than French perfume by volume that easy transition would save money for not only individuals but institutions, such as the U.S. government. Also, formatting with thinner margins would save on paper costs—lesser pages that are printed means lesser purchasing of printing paper. Although, students may not benefit from this as much as the teaching staff would, especially those produce many handouts for their classes. Fonts like Garamond look very similar to Times New Roman, so legibility would not be lost. This would be an easy action that would require little to no sacrifice on the student's end of things.

A third action college students could take would be to enroll in sustainability classes. Whether they enroll due to individual interest in the subject or due to a requirement for a major, student enrollment in sustainability classes increases awareness on environmental, economic and social sustainability issues. But classes about sustainability are not commonplace in every university across the U.S., and one surefire way of changing that is for students to enroll in more sustainability classes. Increased enrollment would slowly increase the demand to provide students with a suitable professor. More professors specialized in sustainability would increase the university's focus on sustainability if it was not already there before. It would be as if sustainability were held to the same degree of importance as chemistry or physics. By establishing sustainability as a core curriculum, students would have a profound effect on the educations of those that follow that will take on the duty of steering society to becoming more sustainable.

A fourth action would be to spread the word of environmental, economic or social sustainability through a student-run newspaper, blog or other form of media. Just starting the conversation may have significant effects on the advancement of sustainability on college campuses; as most college students might think themselves as liberals, they are more likely to take action for a cause they believe in, whether that is joining a club or starting one. A website that highlighted environmental events happening on campus and in the surrounding area could get students the exposure they need to solidify their course of action. Perhaps there are many more students here at RPI that want to take action and make progress in the name of sustainability but just don't know where to start. A student-organized sustainability publication could provide them with several starting points. Here at RPI there is the Student Sustainability Task Force (SSTF), a club that meets to discuss various sustainability projects for RPI and the surrounding community. Student-run publications that focused primarily on sustainability

and environmental projects would provide an excellent bulletin board to herald the weekly meetings of clubs like SSTF, the aim of the said publication being to increase student participation

Finally, students could rally and demand that pro-environmental measures be met at their university. The demands they make do not have to be in the form of protests or any other action with aggressive or rebellious connotations—it could be a demand to create funding for a team in the Campus Conservation Nationals, the largest electricity and water reduction competition for colleges and universities in the world. Students have organizing power that perhaps more powerful than most think. One example of that concerns athletics; I am a member of the Student Athlete Advisory Committee, and through deliberation with administration we were able to extend dining hall hours for athletes to eat after practice. A similar approach could be taken for students that demand more attention to sustainability. If there is a sufficient demand, it is the duty of the university to supply.

#11) Write two exam questions that creatively test students' analytic sophistication about sustainability. Answer one of these questions.

Question 1: The fracking industry has stated that in the past 60 years that fracking technologies and techniques have been in use there have been no documented cases of groundwater contamination. Is this true? Why or why not?

Question 2: Are there sustainability "rights" (if any) that exist that people have, whether they know it or not?

The right to clean water exists in both developing and developed countries, yet each face a different facet of the issue. In developing countries, people may walk miles to the nearest well, just to draw up water that is not the safest to drink, yet is so scarce that they have no other option. In developing countries there is most likely plenty of water for everyone, yet they cannot use it because it has been contaminated from nearby landfills, hazardous waste facilities or fracking activities. It becomes what is known as a "tragedy of the commons", when not only individuals but groups and organizations act independently in accordance with their own self-interests and motivations at the expense of others, namely by behaving in contrast with the population's best interest. Contaminating or depleting a common resource, such as water, goes against inherent public interests. Referring to Abraham Maslow's Hierarchy of Needs, people are motivated to achieve certain needs—once one level is met they move onto the next. The first category of needs in Maslow's Hierarchy is biological and physiological needs; air to breathe, food to eat, water to drink, shelter and warmth from the environment and the opportunity to procreate. When one factor of the most basic category cannot be

met, when that inherent right has been violated, how can one encourage not only a sustainable lifestyle but a healthy one?

In relation to the biological needs in Maslow's Hierarchy, biodiversity could be considered a sustainability right. Biodiversity could be considered in essence a right to all generations of human beings to enjoy the world's animal species—this generation's grandchildren have the right to know polar bears and be able to see them alive and in the wild, not as a picture in a textbook as an animal species that once was. Protecting the right to biodiversity also protects ecosystem health and productivity, therefore enhancing the health of the biodiversity in a cyclic relationship. Another way to think about this is to think about tuna; being a food source, by definition people have a right to eat it, but if the overfishing practices continue there would be no more tuna for anyone to eat. To take away a food source from future generations is almost counterproductive to the survival of our own species—granted, if tuna were fished to extinction there would still be other fish in the ocean for humans to fish and to consume. But all species are interconnected and rely on one another for their own survival to maintain the natural balance that is biodiversity, and if humans systematically extinguish pieces of it then the entire system is at risk of complete collapse.

In an extension to the right to biodiversity, there is also a right to a clean, healthy environment. In other words, the current generation has no right to place the momentous burden of an unhealthy, unsustainable environment onto future generations and to force them to find solutions. Placing future generations in various crises without giving them a proper foundation of weapons does not support the survival of our species. Continued deforestation, extracting more oil, damming rivers, or anything else this generation does merely to extract more profit puts future generations at risk for not only making no profit at all since the resources were exhausted but having no environment in which to thrive. A clean, healthy environment is not only wealthy in monetary terms but in recreational as well. The environment should remain as it is so that future generations can enjoy it as well, so that they can benefit in more ways than merely profit as well. It is the duty of today's generations to provide as stable a world as we can for future generations.

#12) *What attitudes and cultural constructs in the United States do environmental educators need to work against? Briefly describe at least one activity for k-12 students that would work against these attitudes and cultural constructs. Reference at least two films*

A primary social attitude that detracts from the environmental educators abilities is are the views and theories on sustainability issues, mostly about climate change, held by governments and industries. Members of Congress have been known to outright deny climate change, claiming it to be a farce that is not worth paying attention to even when climate experts provide evidence to the contrary. The educators tell their students one thing, and most students probably believe them and think rationally enough to see the facts for themselves, but their governmental leaders tell them another, and

make legislation that either directly or indirectly affects the student at their expense. The educator must not only prepare the student to think critically about sustainability issues but must also prepare them to have their thoughts, opinions and theories be at complete misalignment from some of the leaders of their own country and how to not only accept those differences in opinion but how to find ways to make progress around them. An example is the film *End of the Line*; where the world's top governments were presented with scientific data that depicted the serious decline of many species of fish due to overfishing, and that if significant measures were not taken to ensure that they not only survive but thrive that the oceans would sustain enough fish to last humanity longer. The governments agreed to establishing quotas on the quantities of fish to catch, but they were set very high above the scientifically recommended levels in order to appease the fishing industries. It can be very frustrating for not only the educator but the student as well to be handed valuable tools of what the world needs to survive and thrive, only to find that the people most capable of making positive change in their country simply refuse to do so.

In relation to the taboo governments hold against climate change, the opinions of industry carry substantial weight, and are perhaps a larger burden to the educator. Industry leaders are powerful drivers of getting the changes and laws they want out of Congress that favor themselves at the expense of the public. In colleges across the United States professors (hopefully) prepare their students to be effective members of society once leaving school, and part of that includes prepping the students for jobs in the workforce in specialized fields. But the potential employers of these students may have a different opinion on climate change than the student, so how can the student approach their superior about environmental responsibility without possibly risking their position in the company? In the film *Unearthed: The Fracking Façade*, the fracking industry has denied that their activities cause groundwater contamination. If a student with an environmental background lands a job for a fracking company that is similar to prototypical fracking company highlighted in the film, that student may find themselves between a rock and a hard place—if they don't say something about the harmful practices, those practices will continue, whereas if they say something they may find themselves without a job. Such is the world many college students today will find themselves entering.

In relation to counterintuitive industrial practices with regard to the environment, educators must also educate students about the “throwaway culture” that permeates modern life in developed countries. Many objects today are made of cheap materials and poor assembly, inducing them to break easily and often. When this happens the customer purchases a replacement, therefore a company could turn a significant profit if they skimp on the durability, thus saving expenditures on good building materials. Again, relating back to a position with a company that partakes in this business model, a student may find themselves at a crossroads—until a new material is discovered or created that is both highly durable and very cheap, the student will have to choose between their education background or their job. This is not to say that all industries adopt this business model or that there isn't a cheap, durable material. However, the ease at which society can dispose of mundane objects without thinking twice about the environmental impacts of buying another is a serious crisis, and environmental educators know this.

An activity that would educate youth about throwaway culture would be a plastic collection class project. Designed for 4th-6th graders, it would create a visual for just how much plastic is in many everyday objects. A classroom would have several bins labelled “Classroom”, “Home”, “Other”, and the class would collect plastic objects from those various locations to place in the bins—objects such as water bottles, plastic cutlery, lids from fountain drinks, plastic packaging, etc. As the amount of objects in the bins piles up, the class would be educated about why plastic is so prevalent and its harmful effects on the environment. Proper education about why it is important to recycle and even plastic alternatives for older age groups would provide a basis for the class to create environmentally-friendly policies or class rules. A supplement to the project would be to watch my film idea, *The Adventures of Spork*. The project could become an inter-class or even an interscholastic competition to see who can collect and recycle the most plastic.